sculpturing by mountain glaciers at high and at low levels is clearly brought out. The recession of cirques is the principal process at high levels, while at low altitudes the deepening of valleys and characteristic deposits are the resulting features. A distinction is drawn between high altitude and high-latitude sculpturing. The glaciers in the former location are located on high mountains and therefore have steep gradients which is not necessarily the case for high-latitude glaciers.

In the large polar areas where inland ice is the characteristic form of glaciers, the Arctic and Antarctic each have their own characteristics, which are widely different. The north polar region is largely a sea indented on its margins by projecting land masses, while the south polar region is a continent surrounded by ocean. In the Arctic region the ice is less in areal extent than the land on which it rests, and the bergs derived from the glaciers are relatively small in size because they are calved in narrow fiords, and they are composed of solid glacier ice.

The contrast to these characteristics is found in the Antarctic region where the ice extends beyond the margins of the land into the sea, where, with augmentation by snow, there is formed the extensive shelf ice of which the Great Ross Barrier is an example. Because of the accumulation of snow on this shelf ice the surface is very level, and its upper part is, therefore, composed of soft ice. Any solid or glacier ice present is below the water level. The bergs from this extensive shelf ice are characterized by their immense size, their rectangular shape, and their white porous ice.

All the evidence for the alimentation of the extensive fields of inland ice seems to show that augmentation of material is largely along the margins; not that the snow falls there, but that the constant winds radiating outward from the interior carry in a large measure all the snows with them, and it does not become lodged until the margin is reached.

The volume is attractive for its large number of illustrations, and to the student of glaciers, for its comprehensive list of references, which, unfortunately, are grouped at the end of each chapter, necessitating the awkward suspense of turning pages to find them. A. E. F.

The Road Materials of Washington. By HENRY LANDES, assisted by OLAF STROMME and CLYDE GRAINGER. Wash. Geol. Survey Bull. 2. Olympia, 1911. Pp. 204; figs. 51; pls. 17.

In a survey of the state for road materials, the accessibility to transportation, quantity, quality, and local demand were the principal factors

considered. One hundred and seventy-one samples were collected, and the results of the tests applied in the government laboratories are given. The best materials in each county are described, and the many figures and plates are maps indicating the places where good material is found and where the samples were collected. Practically all the samples tested were of igneous rocks, mainly basalts, and it is upon these that the state will largely rely for its road material.

A. E. F.

Geology and Ore Deposits of the Blewett Mining District. By CHARLES E. WEAVER. Wash. Geol. Survey Bull. 6. 1911. Pp. 104; fig. 1; pls. 10.

This small gold camp lies in central Washington. The region is one of a few Carboniferous (?) and Tertiary sedimentary formations that are dislocated and metamorphosed by several large igneous intrusions. Gold-bearing fissure veins cut a peridotite mass that shows considerable differentiation, and which is now largely altered to serpentine. The gangue minerals are principally quartz and calcite with which are associated pyrite, arsenopyrite, and native gold. Considerable talc is found in the vein walls. It is supposed that the mineralization was related to the intrusion of granodiorite, and it is possible that the serpentinization of the peridotite took place at the same time. The earlier workings were in the oxidized zone, and the ores were free milling, but since the sulphide zone has been reached most of the ores are treated by the cyanide process. The district was first exploited because of its placer deposits.

A. E. F.

Geology of the Berners Bay Region, Alaska. By ADOLPH KNOPF. U.S. Geol. Survey Bull. 446. 1911. Pp. 55; figs. 4; maps 2.

The Berners Bay region forms the northwestern extremity of the long zone of auriferous mineralization known as the Juneau gold belt. The rocks consists of sedimentary slates and graywackes of Jurassic or Lower Cretaceous age, metabasalts, quartz diorite-gneiss, diorite, hornblendite, and felsitic or rhyolitic dikes and sills.

The important ore bodies are largely in the diorite, and are in the form of fissure veins, stockworks, and stringer lodes. The gold occurs in the native state, associated with quartz and pyrite, and lesser amounts of other sulphides and gangue minerals, the resulting ores being usually of a low grade. Descriptions of all the mines are given.

A. E. F.